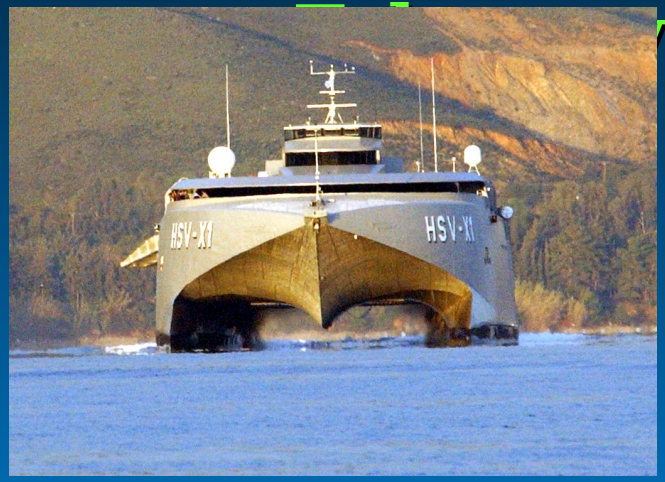
An Evaluation of Alternative Sites for Force Projection in the Vicinity of Camp Lejeune

Donald T. Resio and Andrew Morang



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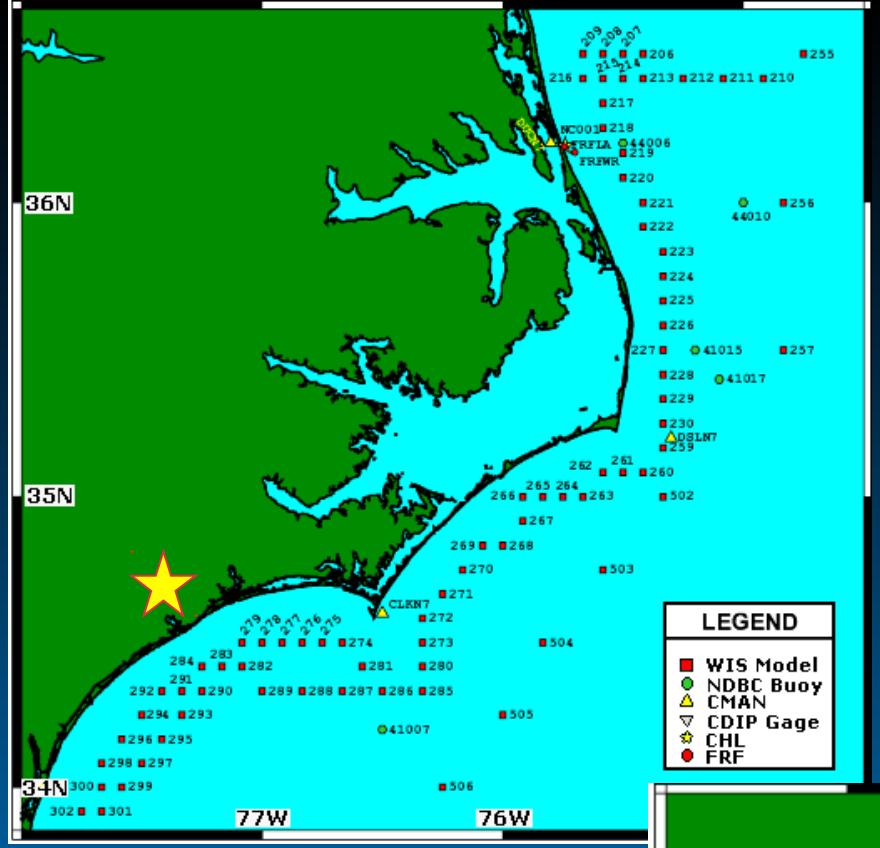
Overall Classes of SPOD's for Force Projection

1. **Strategic Sealift Capable Ports (SDDC)**
2. **JHSV Accessible Ports**
   - **"Ramp Ready" (Small port)**
   - **RPE Required (Austere port)**
3. **Alternatives to Fixed Ports**
   - **JLOTS**
   - **Sheltered non-port sites**

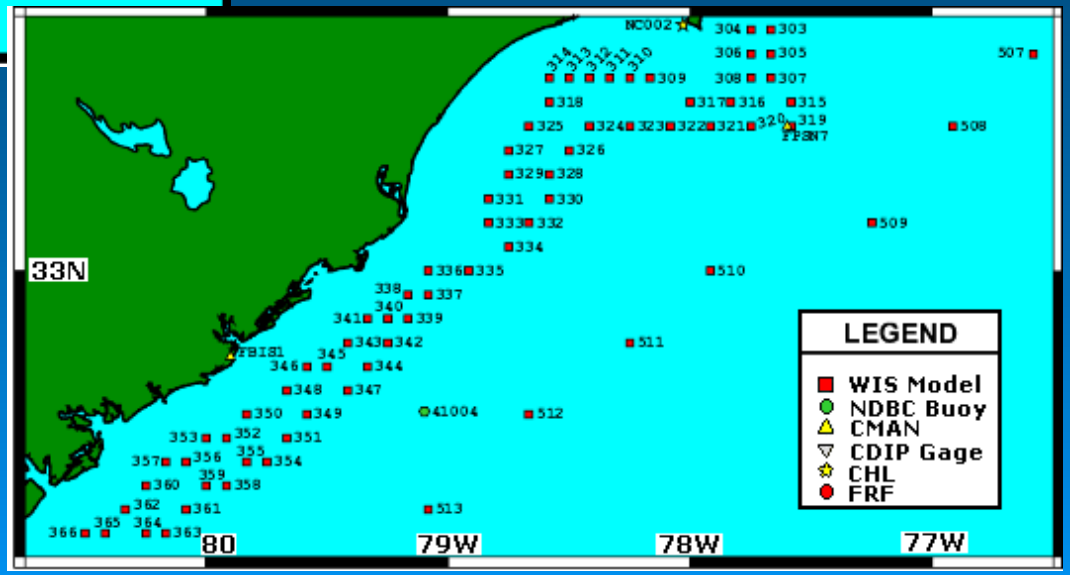
ctive: Examine potential throughputs/risks in vicini
np Lejeune for Bare-Beach JLOTS and three classes
sites ("Ramp Ready" Small Ports; Ports with RPE,
Non-port Sites) (USMC funding)



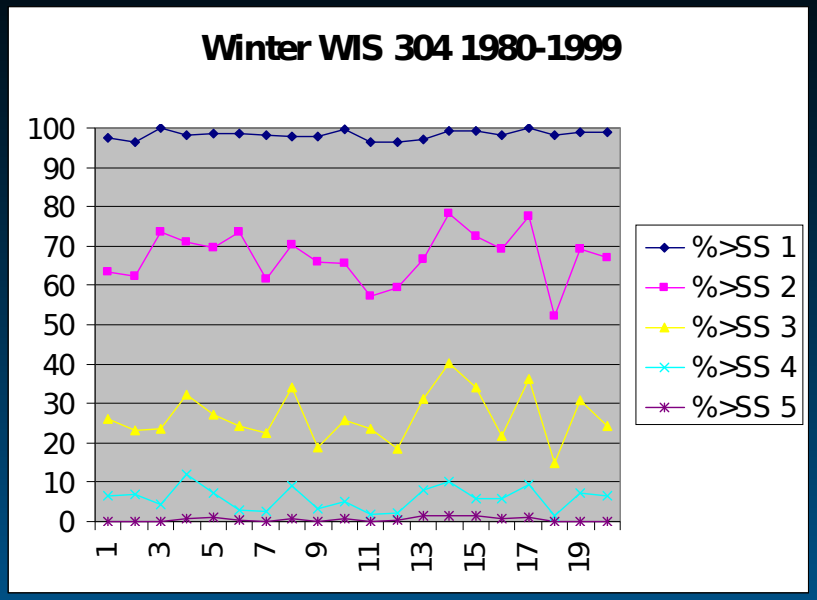
Camp Lejeune
Lat 34.66
Lon 77.46

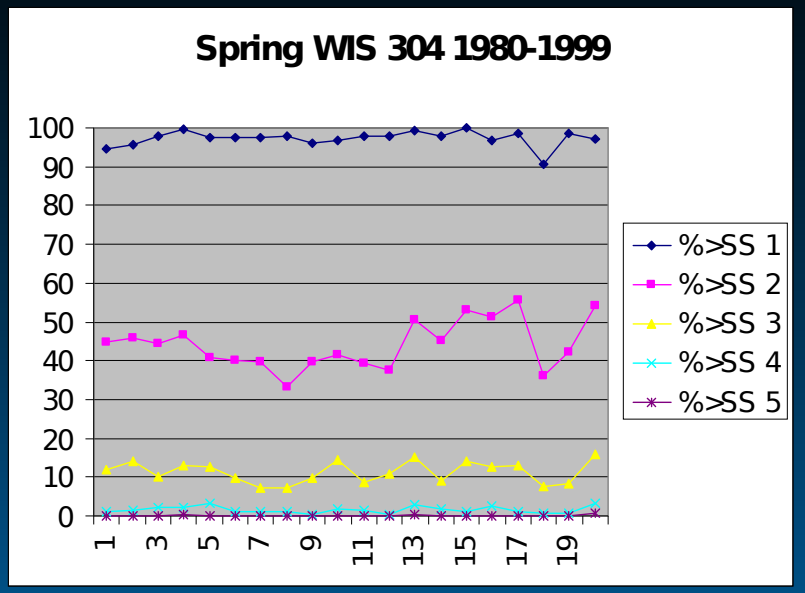
Wave climate in this regio very similar to Southeast

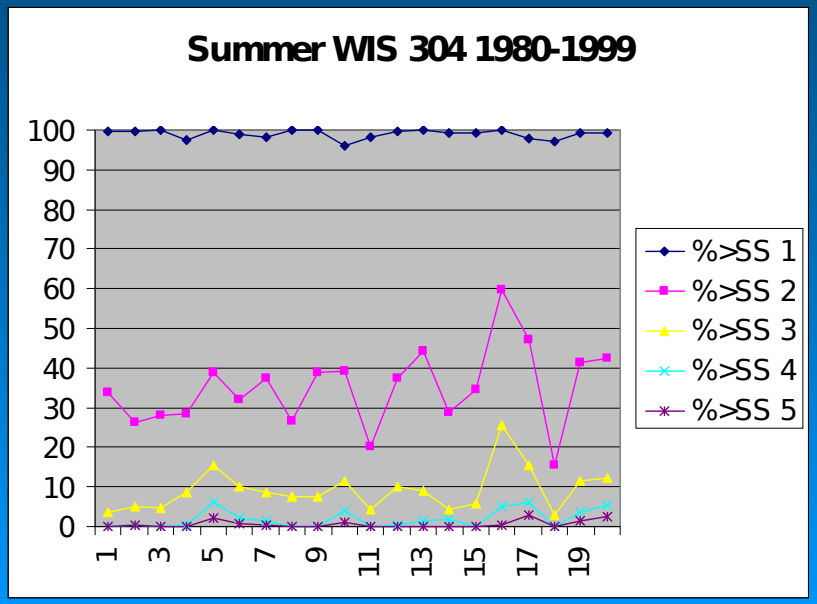
Wave information can now be generated for any area of the world

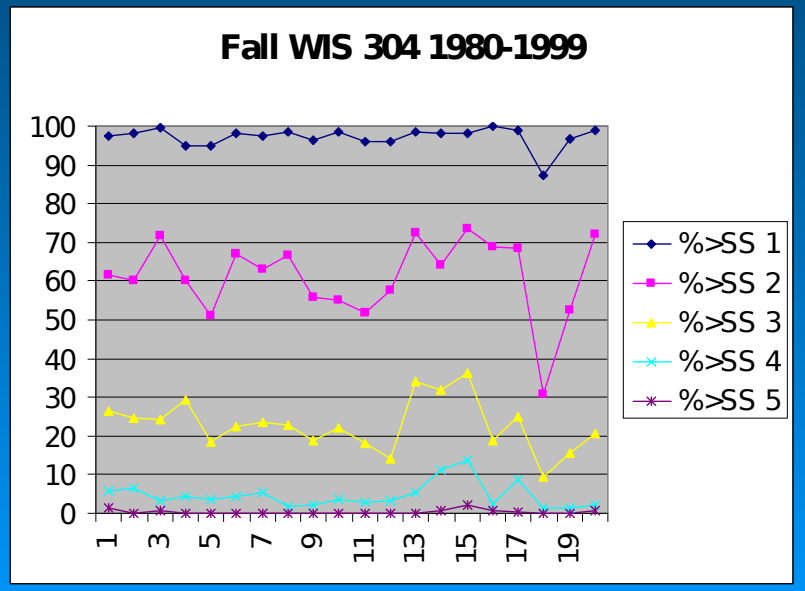


1980-1999 – WIS Data Point 304









ASSESSMENT OF SEASTATE RISKS TO CONTINUOUS JLOTS OPERATIONS: MARCH

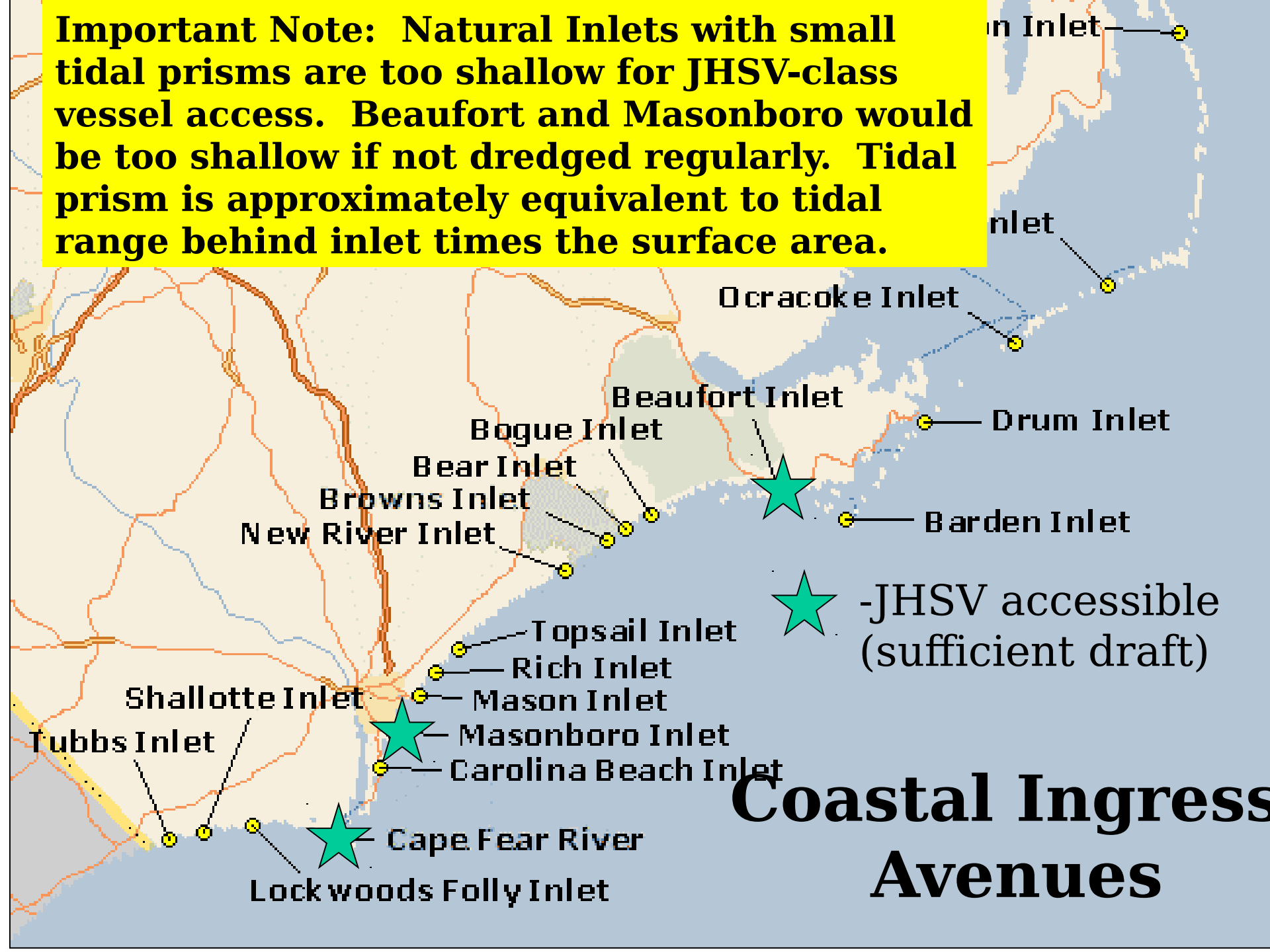
contains non-encounter probabilities (odds of problem avoi

	1 Day	**5 Days**	**10 Days**	**20 Days**
Seastate 1	.05	.01	“0”	“0”
Seastate 2	.19	.07	.01	“0”
Seastate 3	.31	.18	.03	“0”
Seastate 4	.76	.62	.47	.06
Seastate 5	.98	.89	.73	.38

ASSESSMENT OF SEASTATE RISKS TO CONTINUOUS JLOTS OPERATIONS: JULY

contains non-encounter probabilities (odds of problem avoi

	1 Day	**5 Days**	**10 Days**	**20 Days**
Seastate 1	.09	.04	.01	“0”
Seastate 2	.83	.67	.38	.13
Seastate 3	.93	.86	.69	.35
Seastate 4	.99	.97	.88	.77
Seastate 5	“100”	“100”	“100”	0.98


Important Note: Natural Inlets with small tidal prisms are too shallow for JHSV-class vessel access. Beaufort and Masonboro would be too shallow if not dredged regularly. Tidal prism is approximately equivalent to tidal range behind inlet times the surface area.
n Inlet
nlet
Ocracoke Inlet
Beaufort Inlet
Drum Inlet
Bogue Inlet
Bear Inlet
Browns Inlet
New River Inlet
Barden Inlet
-JHSV accessible (sufficient draft)
Topsail Inlet
Rich Inlet
Mason Inlet
Shallotte Inlet
Masonboro Inlet
Tubbs Inlet
Carolina Beach Inlet
Cape Fear River
Lockwoods Folly Inlet
Coastal Ingress
Avenues

Oregon Inlet
Hatteras Inlet
Ocracoke Inlet
Beaufort Inlet
Drum Inlet
Bogue Inlet
Bear Inlet
Browns Inlet
New River Inlet
Barden Inlet
- cargo transfer assets in
- cargo transfer assets un
- no cargo transfer assets
available
Topsail Inlet
Rich Inlet
Mason Inlet
Masonboro Inlet
Carolina Beach Inlet
Shallotte Inlet
Tubbs Inlet
Cape Fear River
Lockwoods Folly Inlet
Coastal Ingress
Avenues

Site Assessment Approach

(Indicative of methodology applicable to world-wide operational requirements)

1. Determine quality, coverage, and appropriateness of maps, bathymetry data, and aerial photography from various sources (web, government, state, military).
2. Develop methods to organize and display data
3. Evaluate potential landing sites
4. Verify with field inspection
5. Refine evaluation

Unclassified Data Sources

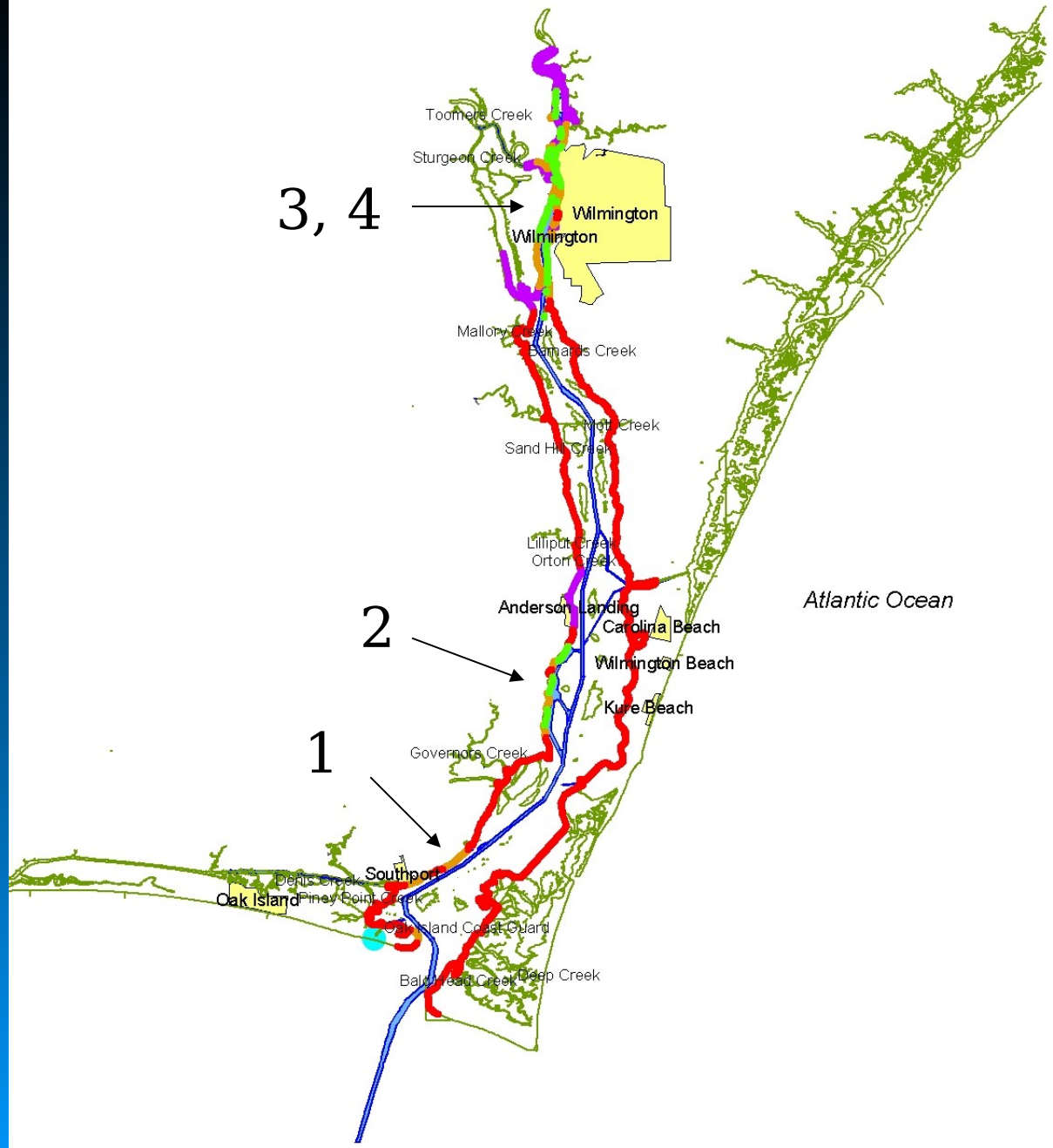
- Web-based
  - NOAA (raster and vector charts)
  - North Carolina DOT and OneMap
  - USGS
  - TerraServer - USA and international
- NIMA – ARC Digital Raster Graphics - USA and international
- USACE – bathymetry
- Commercial (*e.g.*, MapTech, OmniMap) - USA and international

Visual Interpretation

- **Green**: Direct offload at the shore or wharf
- **Orange**: Offload via portable causeway (< 600 ft from 15-ft channel)
- **Purple**: < 600 ft from channel but unsuitable geomorphology (swamp, no roads, obstructions, barrier island)
- **Red**: Too far from channel (> 600 ft)

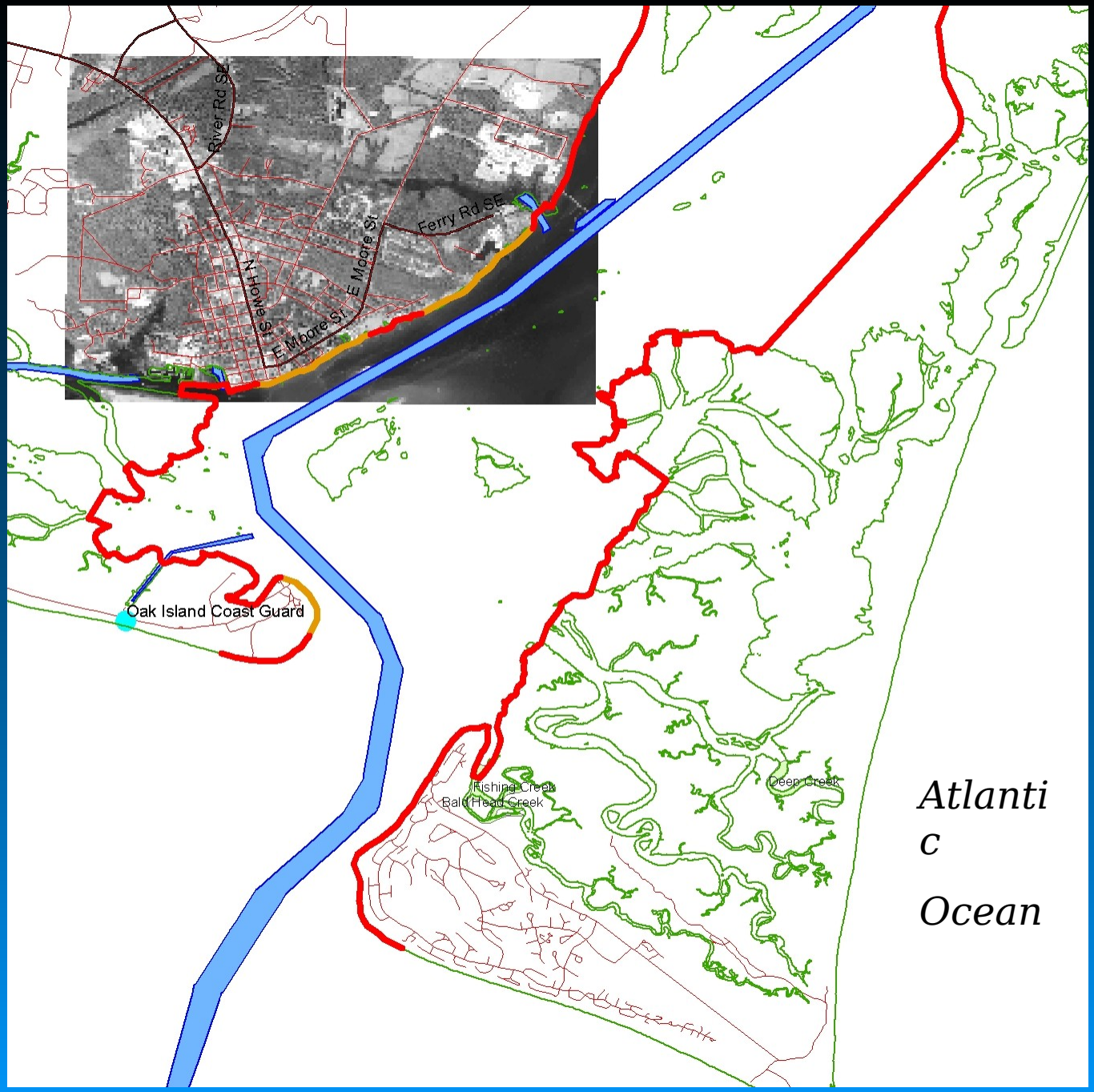
Cape Fear River Estuary

Note: much of shore too far from channel



Site 1: Southport

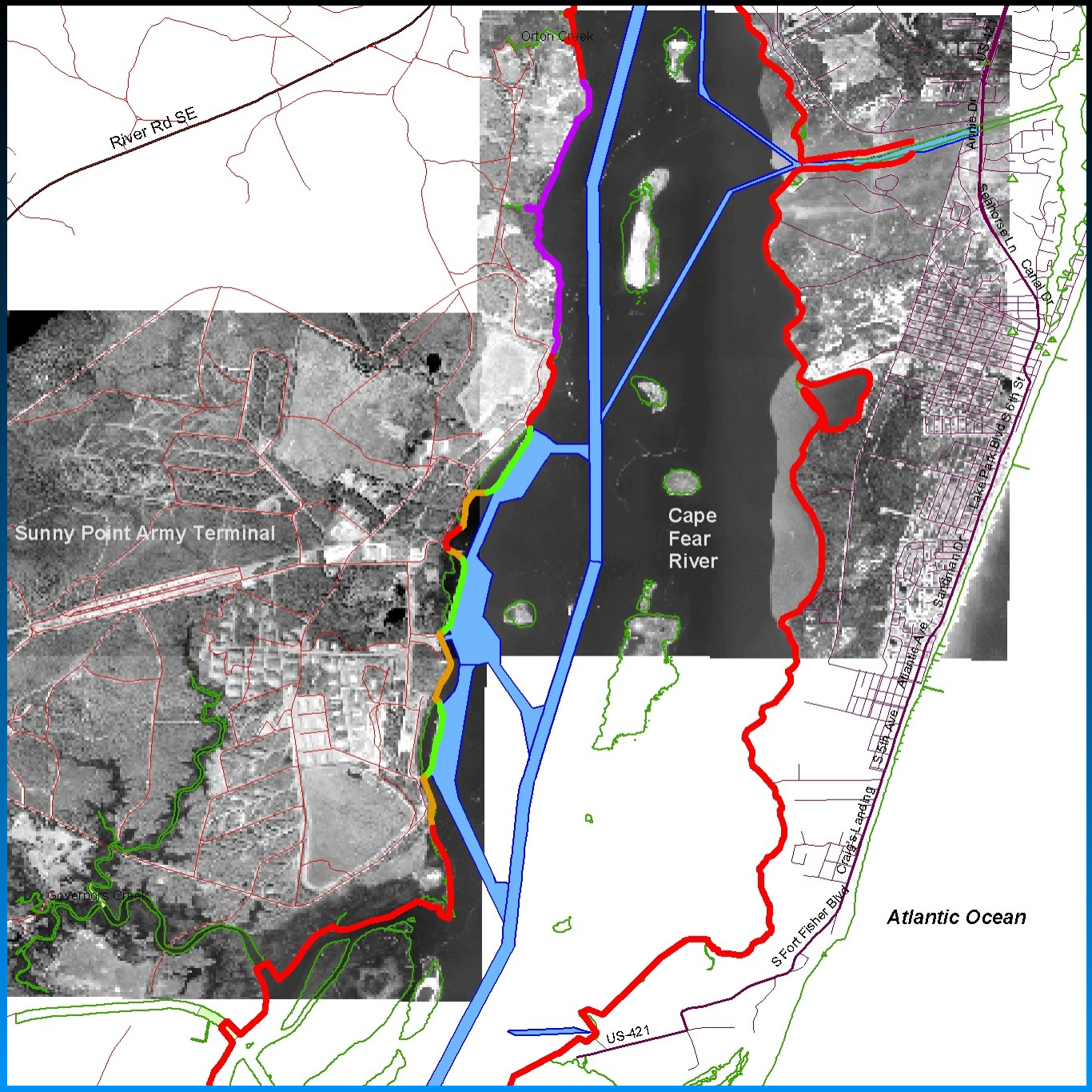
- 3.5 nm from ocean
- Paved roads
- Causeway needed, no direct offload



Southport – possible causeway sites

Site 2: Army Terminal

- 9.3 nm from ocean
- Paved roads, heavy rail
- No urban congestion
- 45-ft dredged channel
- 2 wharfs deep-draft



MOTSU – Wharfs and Ramp

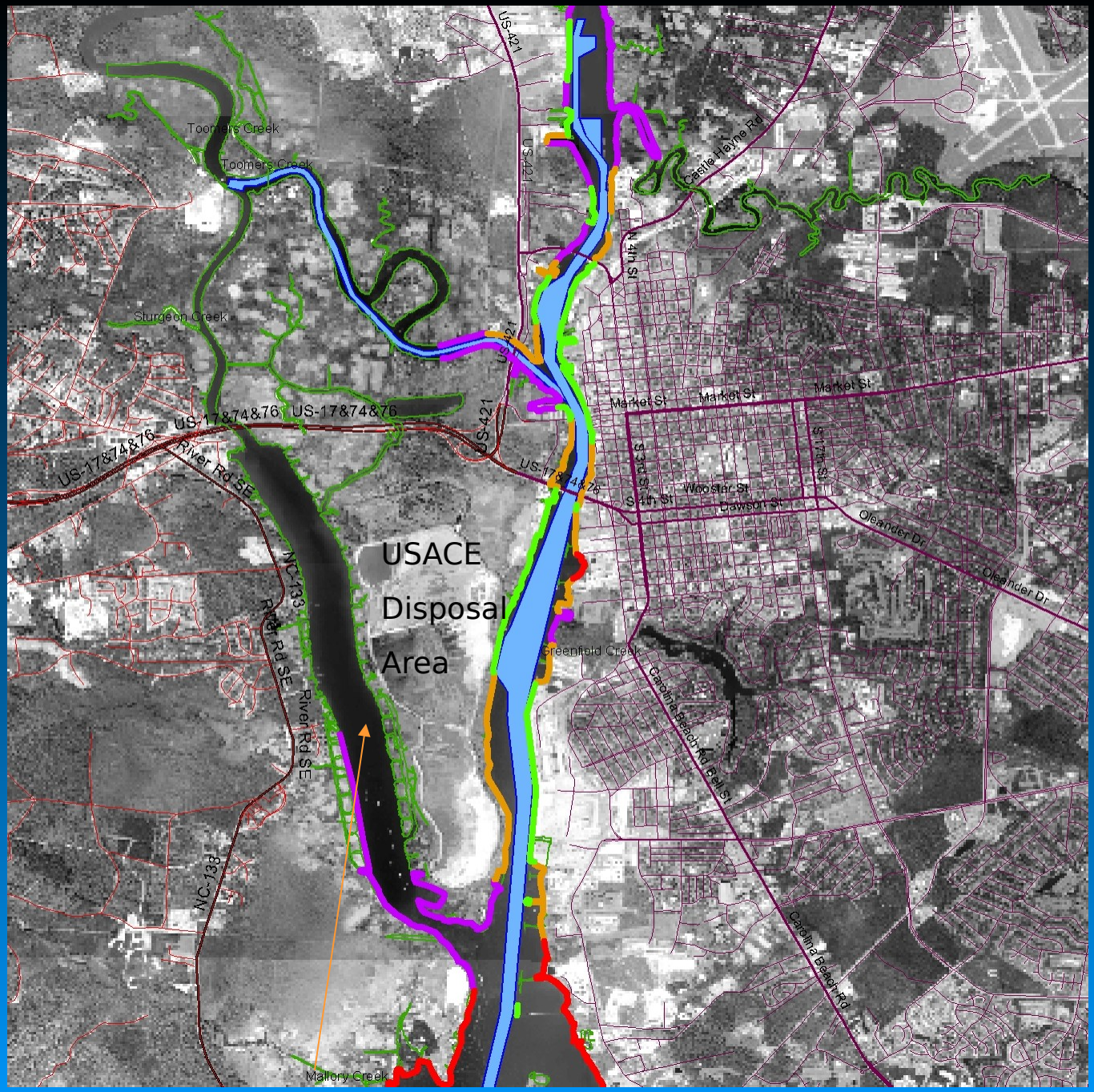
South wharf (> 40-ft dredged)

N. fetch and strong tidal currents)

Boat ramp for causeway (possibly to be improved by USCG)

Sites 3, 4: State Docks; City of Wilming-ton

- Ex. road and rail
- Urban congesti on
- > 22



Not dredged (former reserve fleet mooring)

Wilmington W. Side of Cape Fear River

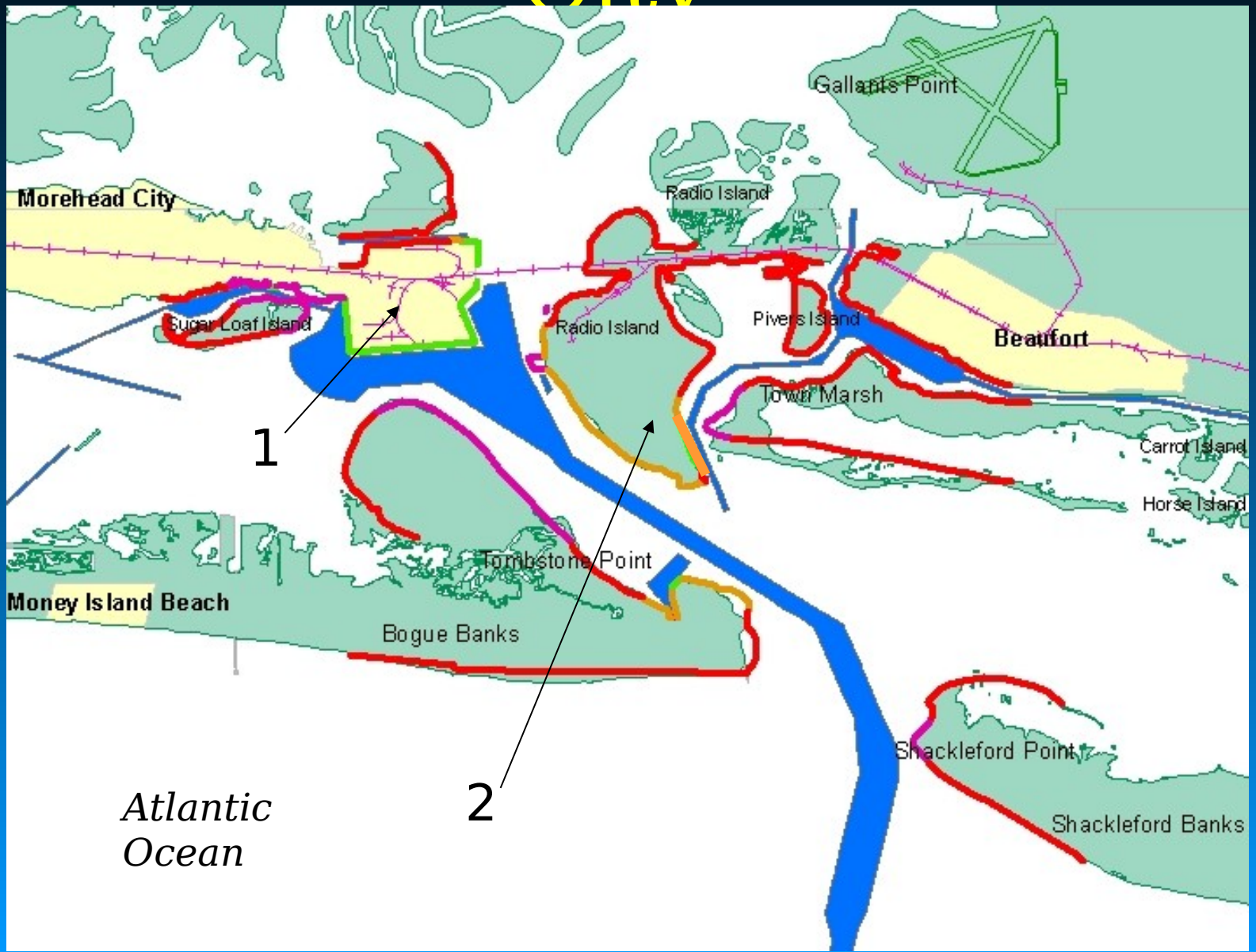
USACE disposal area, suitable for causeway

Direct offload at docks S. of HWY 17 bridge

Inlet 2: Masonboro Inlet

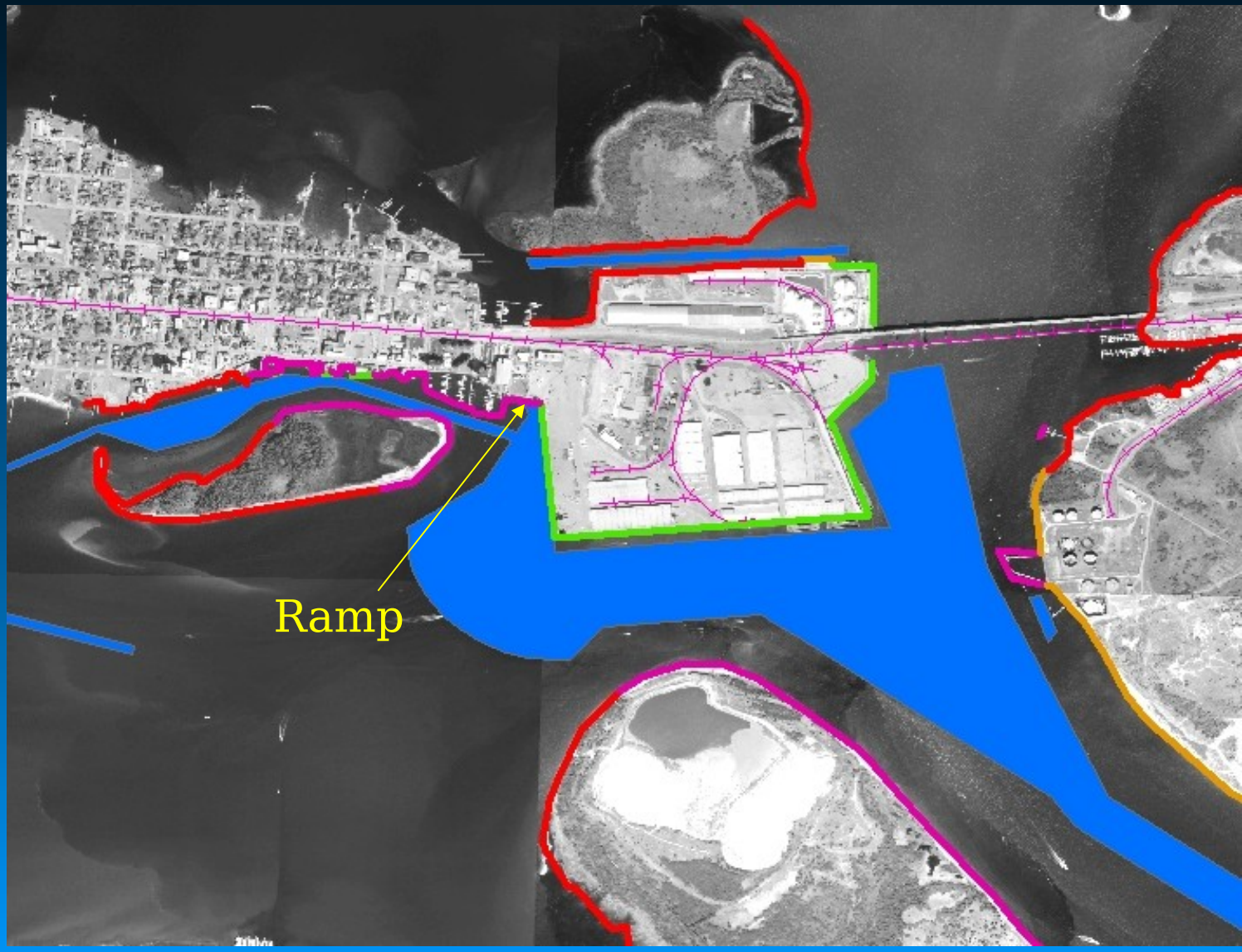
- Possible offload at S. end Wrights-ville Beach
- Paved roads through congested communit y
- Bridge

Inlet 3: Beaufort / Morehead City



Site 1: State Docks

- 2.1 nm from ocean
- 46-ft deep channel
- Heavy rail and road, but pass through



Site 2: Radio Island

- Possible offload E. and W. side Radio Is. with causeway
- LST ramps – wave, current exposure
- Most of chan. to

Morehead/Radio Is. Offload Sites

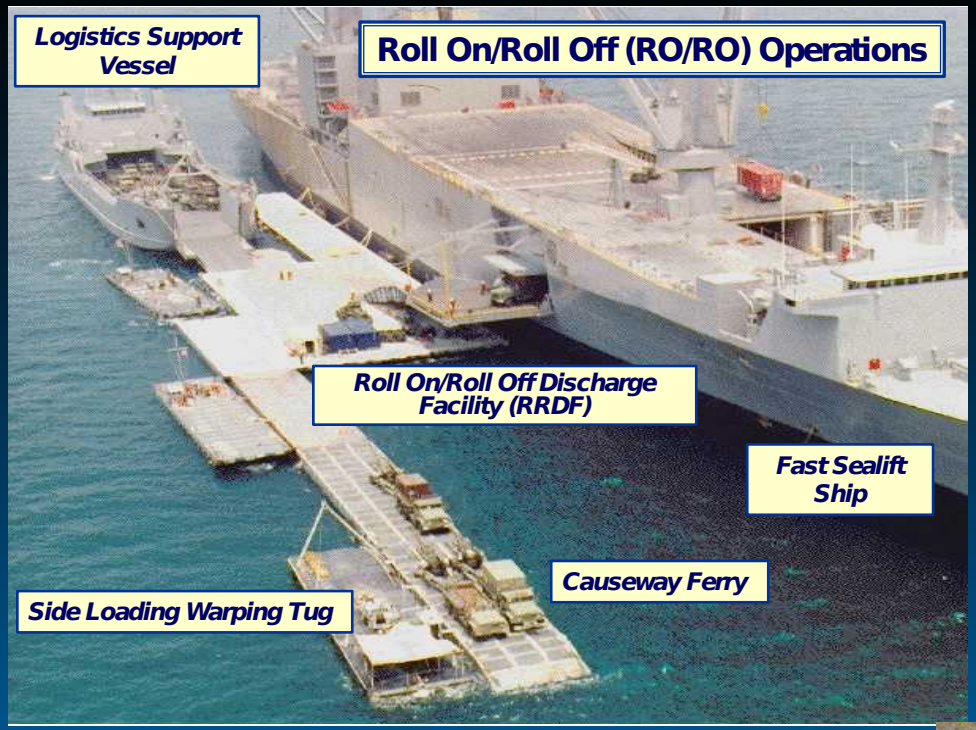
LCU ramp S. end Radio Is.

USMC RO/RO ramp

E. side Radio Is.

Findings – NC Test Case

- NC: low-gradient coastal plain on a trailing edge of a continent. Natural inlets normally too shallow for JHSV.
- Entrance only possible via dredged channels except Cape Fear R.
- Only direct offload opportunities are at commercial or military wharfs.
- Total shoreline for causeway offload: ~ 12.5 stat. mile
- Within reach of causeway but unsuitable geomorphology or no road access: ~ 21.5 stat. mile

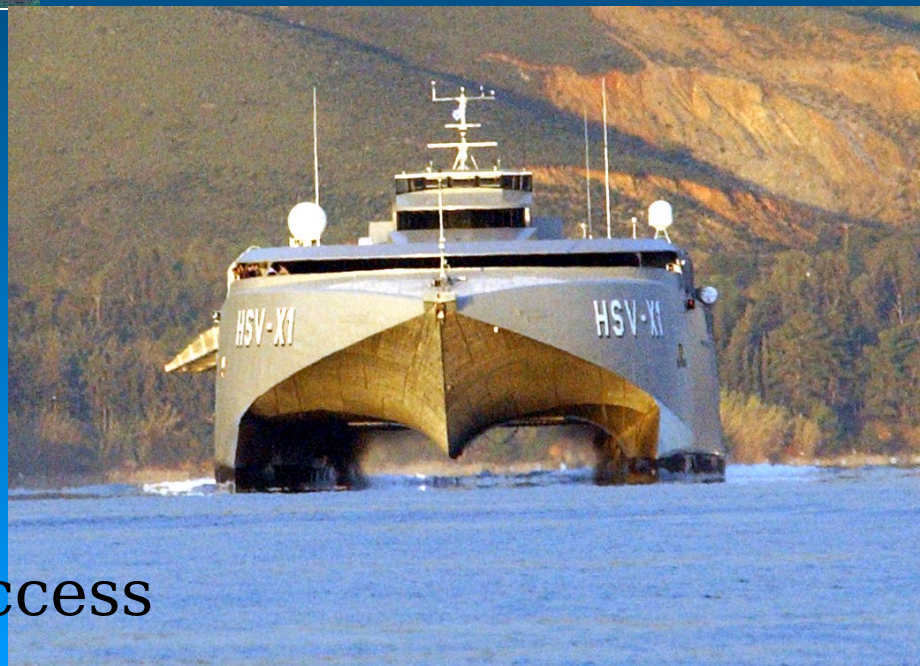


JLOTS operations:

Several vessels/assets re
Cost > $80k per day
Logistics Personnel > 10
Major Problem – Sea Stat
at transfer
nodes (2)

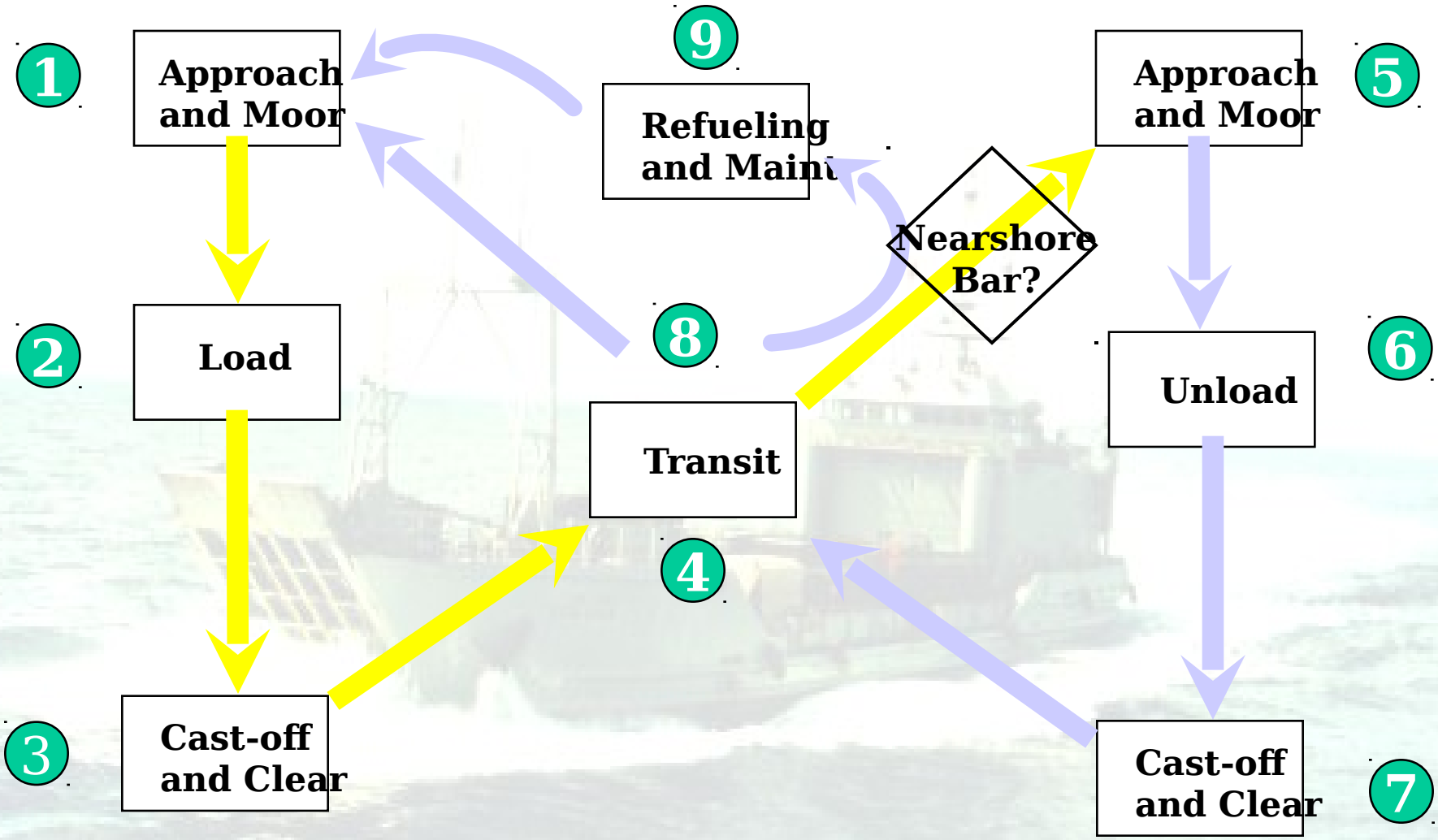
JHSV operations:

Single vessel
Cost <$30k per day
Logistics Personnel < 25
Major Problem – Ensured Access



JLOTS

Operations Flow Diagram

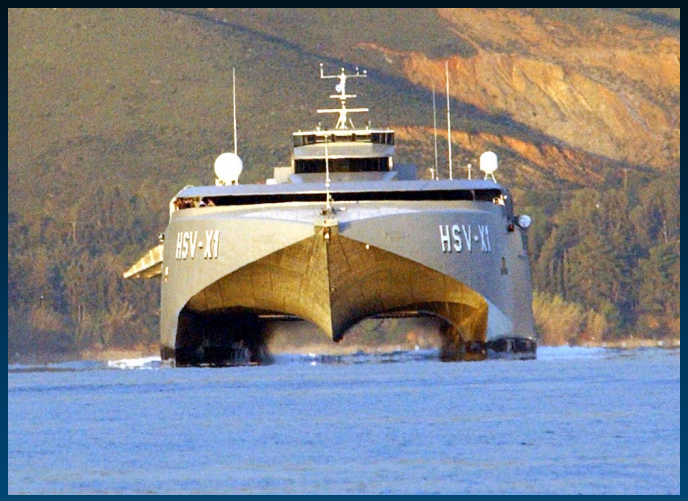


$$t_i = \text{Base Time} * F_{exp} * F_{tod} * F_{ss} * F_{comp} + \text{Queue}$$

$$t_{total} = \Sigma t_i + t_{maint} + t_{fuel}$$

JLOTS

ISB/Sea Base to Alternative Site



Some Key Throughput Factors

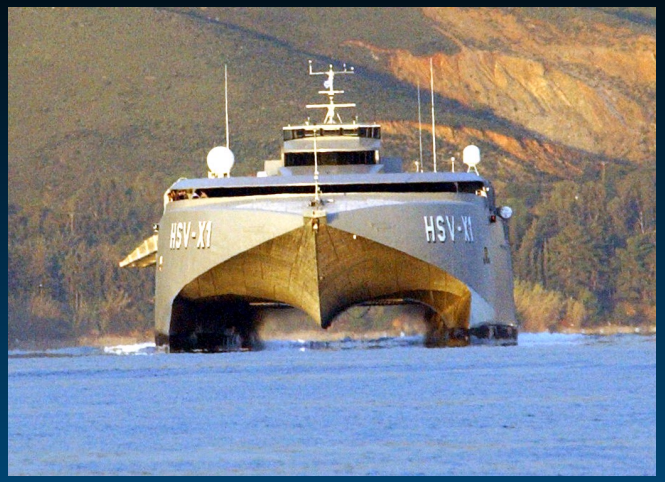
JLOTS assets
Sea State/tides/currents
- normal
- extreme

Nearshore Bathymetry
Ship to shore distance
Inland bottlenecks

Number of JHSV vessels
Upload time
Distance from ISB/Sea Base to
Entrance/interior distance
Cargo discharge rate per vesse
Number of berths/lanes
Inland Bottlenecks

JLOTS

ISB/Sea Base to Alternative Site



Ancillary Information

Initial setup time 4 days
Sea state effect from climate
Catastrophic wave height SS5
- July 1/20 years
- September 8/20
- March 17/20 years

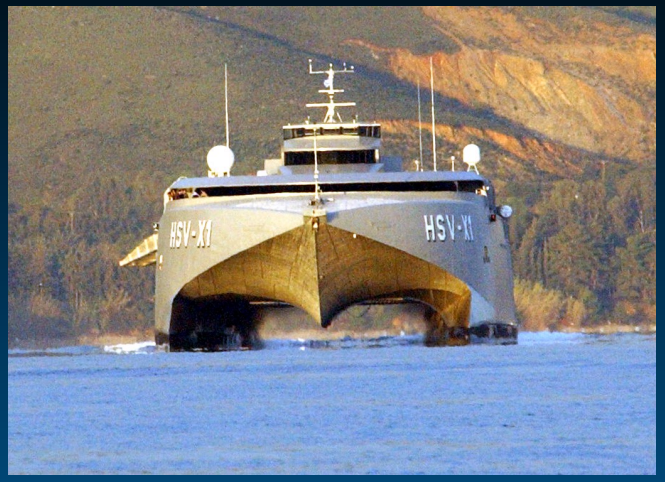
No inland bottlenecks

Distance to ISB/Sea Base (10
Initial LMCS setup 6 hours
105 vehicles onboard
Entrance/Interior approach t
- Beaufort – 1.0 hr
- Masonboro – 1.0 hr
- Wilmington – 1.0 hr/4.5 h

100-200 feet of causeway ne
No inland bottlenecks

JLOTS

ISB/Sea Base to Alternative Site



Assumed Throughput Rates

8-16 vehicles/hr

25-70 vehicles/hr

Seastate time reduction

Assume 35 vehicles/hr (at

March 61% 3.9 vehicles/hr

July 10% 9.0 vehicles/hr

(assumes re-setting up is instantaneous)

Number of JHSV Vessels JLOTS

Requires 2 Lanes at 4 vessels

Time in Days

	1	2	5	10		
1	72	144	288	576		0
2	168	336	840	1680		0
5	456	912	2280	4560		94
10	936	1872	4680	9360		562
20	1896	3792	9480	18960		1497
30	2856	5712	14280	28560		2434

Requires 3 Lanes at 7 vessels

hicle Throughput Comparison: March/Southp

s in Table = Number of Vehicles (mix of Stryker and

CONCLUSIONS

JHSV's offloading at "Alternative Sites" can provide effective op
for SPOD throughput with effective causeways

Initial setup for alternative sites is much faster than for Bare b
JHSV's – offer a significant advantage for small-fast inser

Long term throughput for JHSV's can exceed major bare-beach
vessel requirements to achieve comparability with large JLOTS
no Sea-state 3 shutdowns in JLOTS are (for 10-day operation)
2 vessels at 100 nm
3 vessels at 200 nm

Catastrophic sea states (damage) will likely be a major problem
bare-beach JLOTS operations

Major sea state problems are avoided in alternative site operati

Multiple Berths could offer a very important option for short te
very high throughput rates

WHAT IF??

No Fixed Ports

Fixed Ports are Saturated

Ports are denied

1990 - Kuwait: Ports destroyed

2003 - Saudi Arabia/Turkey: Ports deni

Waves enter port areas

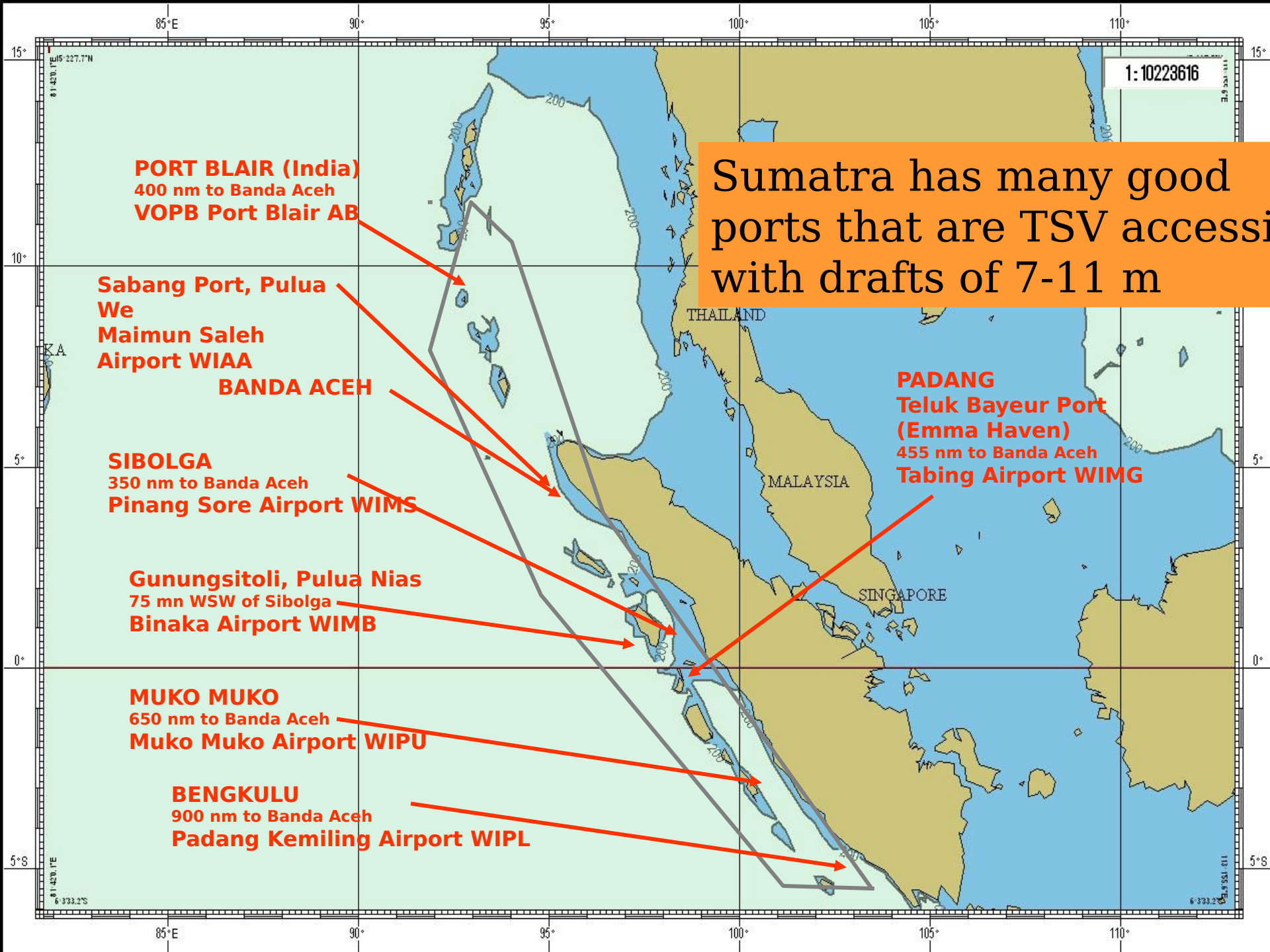
Inadequate Port Facilities

- Damaged
- Draft restricted
- No Crane support
- No Container support
- No RO/RO ramps

Augment an established port

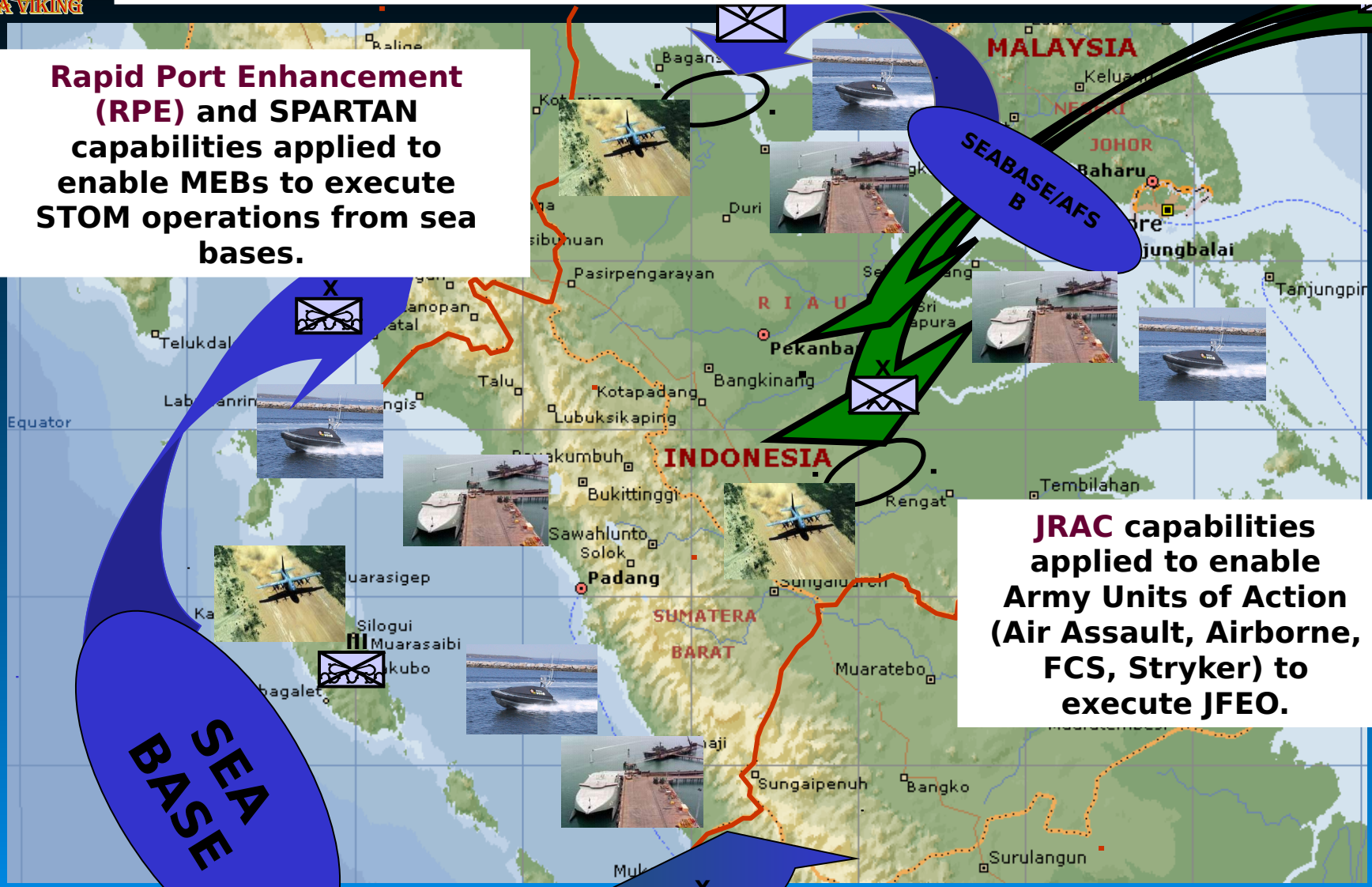
Supplement a degraded port

Add alternative site

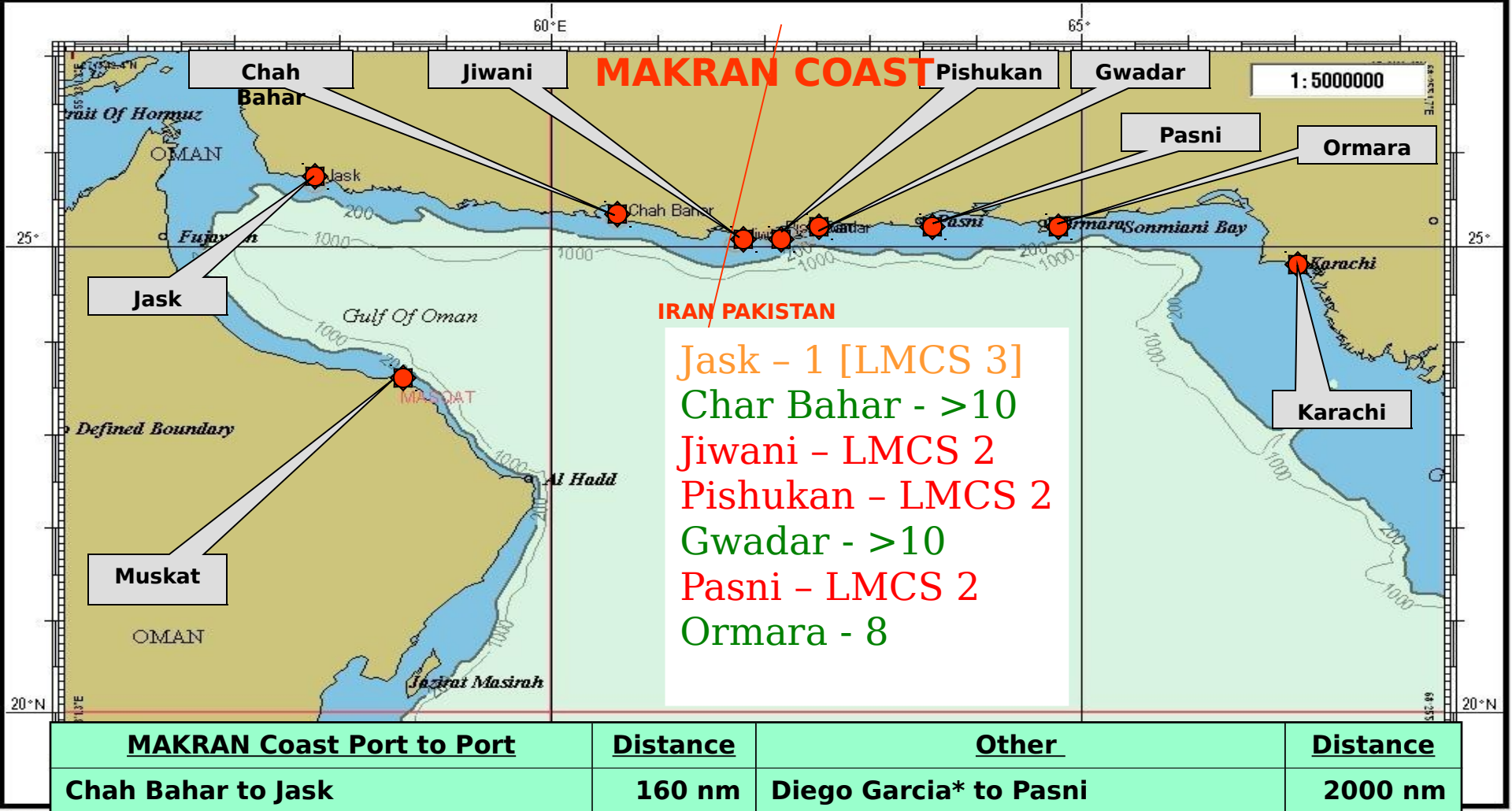

Sumatra has many good ports that are TSV accessi with drafts of 7-11 m
PORT BLAIR (India)
400 nm to Banda Aceh
VOPB Port Blair AB
Sabang Port, Pulua We
Maimun Saleh Airport WIAA
BANDA ACEH
SIBOLGA
350 nm to Banda Aceh
Pinang Sore Airport WIMS
Gunungsitoli, Pulua Nias
75 mn WSW of Sibolga
Binaka Airport WIMB
MUKO MUKO
650 nm to Banda Aceh
Muko Muko Airport WIPU
BENGKULU
900 nm to Banda Aceh
Padang Kemiling Airport WIPL
PADANG
Teluk Bayeur Port (Emma Haven)
455 nm to Banda Aceh
Tabing Airport WIMG
THAILAND
MALAYSIA
SINGAPORE
1:10223616

Role of ETA has been evaluated in recent wargame

Rapid Port Enhancement (RPE) and SPARTAN capabilities applied to enable MEBs to execute STOM operations from sea bases.



JRAC capabilities applied to enable Army Units of Action (Air Assault, Airborne, FCS, Stryker) to execute JFEO.



MAKRAN Coast Port to Port	Distance	Other	Distance
Chah Bahar to Jask	160 nm	Diego Garcia* to Pasni	2000 nm
Jiwani to Chah Bahar	65 nm	Bombay, India* to Pasni	650 nm
Pishukan to Jiwani	22 nm	Doha, Qatar* to Pasni	700 nm
Gwadar to Pishukan	14 nm	Muskat, Oman to Pasni	290 nm
Pasni to Gwadar	65 nm		
Ormara to Pasni	66 nm		
Karachi to Ormara	130 nm	* Port not shown on map	